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ABSTRACT

This document reports the Center's current thinking about PPBS and data-based educational planning. In the introduction, PPBS is defined, the usual conceptualization of PPBS is outlined, current pressure to adopt PPBS in public education is discussed, and current efforts at such implementation are reviewed. The second part deals with basic concepts of a systems model and provides a detailed explication of three interrelated models. The third part relates these three systems models to PPBS, refines the original conceptualization, and provides a framework that is used in the fourth part to discuss possible innovation strategies for implementing PPBS. (DE)

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PPBS AND DATA-BASED EDUCATIONAL PLANNING

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PPBS AND DATA-BASED EDUCATIONAL PLANNING

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Reprint of

PPBS AND DATA-BASED EDUCATIONAL PLANNING

Preface

One project (5001) in CASEA's Program 50 is devoted to the development of instructional materials for preparing school administrators to adopt Planning, Programming, Budgeting Systems (PPBS) in their school districts. As school administrators, professors of school administration, and others have become aware of our involvement in this substantive area, we have been inundated with requests for information about the Project on PPBS Instruction and about PPBS in general. We are, therefore, making available the reprint which follows as a means of reporting the substance of our current thinking about PPBS and data-based educational planning. To provide first a context for the actual report, a brief description of CASEA's Program 50 follows.

New knowledge about educational organization and administration is not readily transformed into improved educational practice. Consequently, CASEA's Program 50 has been created as a vehicle for synthesizing this new knowledge and incorporating it in instructional packages which will help school administrators meaningfully translate theory into practice. The Program has been carefully organized around a general systems design which will facilitate the continued and efficient production of instructional materials. To the extent possible,

explicit operational objectives will be established for each product developed, and evaluative feedback from field testing the materials will be used to determine the degree to which these stated objectives can actually be achieved.

Three foci will provide direction for the seven projects to be undertaken in Program 50 between 1970 and 1975. For instance, four consecutive projects will focus upon employing emergent technology in educational planning. Ultimately these four projects on PPBS, Advanced Educational Planning, Management Information Systems, and Integrated Systems Management will assist school personnel who are interested in developing an integrated systems- and computer-based planning operation in their school or district. A second set of projects will focus upon improving the group processes which necessarily occur among school personnel as they perform their organizational functions. One of these will provide general training for teachers and administrators in group problem-solving at a level applicable to most groups convened in schools. Building upon this general training, the second group processes project will provide training for participation in such specialized groups as curriculum committees, administrative cabinets, faculty meetings, and so forth. Finally, Project Inform will provide the third major focus of Program 50. Project Inform will supply school administrators with information derived from theoretical and empirical research which is applicable to practice; but, unlike the other projects, the products of Project Inform will be disseminated directly to administrators for self-instruction rather than packaged for group interaction with a trained consultant.

The instructional materials produced in CASEA's Program 50 will be disseminated for the in-service and pre-service education of school administrators through cooperative relationships with other organizations. For instance, we will encourage the use of these materials in workshops sponsored by the AASA National Academy for School Executives, the National School Development Council, Regional Educational Laboratories, The University Council for Educational Administration, and other organizations.

In December, 1969, we were asked by the National School Development Council to coordinate a one-day workshop on PPBS for representatives of their membership. This workshop--held in Atlantic City, New Jersey, on February 13 and 14, 1970--provided an impetus for us to bring together in one statement the results of nearly six months of effort in reviewing PPBS literature, interviewing others who are working in the field, and developing our own eclectic conceptualization of PPBS and strategy for its implementation. Stimulated by this challenge, we attempted to capture the essence of PPBS in a relatively brief written statement. Because it provides the substantive base upon which we intend to build the CASEA Program 50 instructional materials on PPBS, it seemed worthwhile to reproduce the statement at this point in our work.

During the next few months, our efforts will have two primary objectives: first, to extend, refine, and operationalize the "CASEA Approach" to implementing PPBS in schools; and second, to prepare written and audio-visual materials

which will effectively educate school administrators about PPBS. We envision the forthcoming instructional package as a series of didactic presentations integrated with exercises and simulations through which a school administrator can develop not only a cognitive understanding of PPBS, but also the human and technical skills required for actually implementing and operating a data-based educational planning system.

PPBS AND DATA-BASED EDUCATIONAL PLANNING

Part One: Introduction

Less than two months ago, members of the American Association of School Administrators received copies of the report submitted to AASA by its Commission on Administrative Technology. Created four years ago, the Commission was requested "to identify recent developments in administrative technology in other fields, determine the feasibility of adapting what has been successful elsewhere to school administration, and facilitate dissemination of concepts of the new administrative technology that are pertinent to the profession."[1] The report contains the findings of the Commission's investigation.

In those findings, the Commission identifies both intellectual and machine technologies which can contribute to the resolution of complex problems in school administration. What is particularly significant to a practicing school administrator, however, is this conclusion drawn by the Commission:

> Whatever the type of technology and whatever the area to which it is applied, certain demands are placed upon the would-be user. Where it is to be used to enhance organizational decision making, the technology may require the administrator to produce a more precise definition or clarification of objectives in operational terms, more highly organized and carefully analyzed data that shed light on the goals, more explicit formulation of educational programs

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[1]Stephen J. Knezevich (ed.), Administrative Technology and the School Executive, A report submitted by the AASA Commission on Administrative Technology (Washington: The Association, 1969), p. 7.

> and procedures, more accurate indicators and measures of organizational outputs, and more careful weighing of the consequences of alternative proposals than would be the case in the traditional approaches to decision making. This new intellectual technology related to the art and science of rational decision making is the basic substance of what is called the systems approach. It is a new way to frame and to analyze complex problems demanding a decision. Its recently developed techniques represent a more precise and disciplined approach to problem solving.[2]

One of the most significant of these new techniques is PPBS, an acronym which stands for planning-programming-budgeting systems. Although a great mystique has developed about PPBS during the last decade, the term itself serves only to identify a systems-based approach to future-oriented organizational decision-making--that is, a systems approach to organizational planning.

The Relationship Between PPBS and Educational Planning

As already indicated, PPBS is an approach to planning. That is, it is not an end in itself, but rather a means to an end. The desired end is, of course, educational planning which is rational, systematic, output-oriented, and clearly data-based. And PPBS is a means to that end because it provides educational decision-makers with a framework, structure, or process for systematically relating organizational activities to organizational goals and objectives in such a way that more effective and efficient decisions can be made regarding the future allocation of resources among alternative ways to achieve those goals and objectives.

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[2] Ibid., p. 22.

As generally used, the term planning refers to the development of a detailed method, formulated beforehand for doing or making something. It is concerned with the question of how to achieve a given end and results in decisions about future processes and the inputs to those processes. In a PPBS context, however, planning takes on a more complete definition, for a decision-maker must not only be concerned with developing a plan for future processes and inputs, but he must also be concerned with evaluating the outcomes or outputs of that plan. Throughout this discussion, therefore, we will draw a sharp distinction between these two kinds of planning. More specifically, we will refer to the first kind of planning--that generally done--as input-oriented planning and to the second kind--that done in a PPBS context--as output-oriented planning. In Part Two, we will deal in considerable depth with the basic concepts underlying a systems model for output-oriented educational planning, a model which takes into consideration and so requres information about a set of processes, the inputs to those processes, and the outputs from them.

For the moment, however, suffice it to say that PPBS represents a first step in the effort to develop a planning system for an educational organization which is clearly out-put-oriented as well as rational, systematic, and based upon objective data. It does so because it requires a decision-maker to do each of the following: (1) define goals and objectives and set priorities in view of available data or information regarding inputs, processes, and outputs; (2) group organizational processes into sets of activities or programs which can be

defined in terms of the goals and objectives defined and the priorities set; (3) generate, budget over time, analyze, and select alternatives within and between the defined sets of activities or programs; (4) implement, monitor, account for, and evaluate those selected alternatives; (5) up-date the bank of available information; and (6) use this new information to recycle the planning process at any or all points in the system.

At this point, a word of caution and explanation should probably be interjected. Because systems planning can be traced most directly to systems engineering where highly refined technologies have been developed for conceptualizing and designing complex physical systems, some aspects of PPBS and related planning technologies seem quite mechanistic. Unfortunately, the apparent mechanistic nature of these systems-based planning technologies has led many educators who view themselves as humanists to characterize the whole process of planning as "social engineering" and to decry the apparent "fact" that humanistic values are not considered. What these critics miss, however, is the distinction between a means and an end. As already suggested, PPBS and its related technologies are means--not ends. They provide a system or method for collecting and arranging information in a logical, meaningful manner, and they have the allure of objectivity and dispassionate observation characteristic of our so-called "hard sciences." The ends to which these technologies are put, however, are almost unlimited. Moreover, if an educational decision-maker chooses to become a servant of the technology, most assuredly his behavior, like that of

any automaton, will be mechanistic; if, on the other hand, he makes the technology his servant, the means to his end, then it can help him achieve even his most humanistic objectives.

The Usual Conceptualization of PPBS

During the last decade, much has been written about PPBS. As typically conceived, it is expected to involve a school district and its personnel in the following seven broad procedures:

1. District personnel identify and refine the complete set of educational philosophies, goals, and objectives which either do now or should in the future guide all activities in the district. This set is expected to be educationally sound, relevant to the needs of students, and supported by both citizens in the community and professional personnel in the schools.

2. District personnel translate the defined philosophies, goals, and objectives into organizational "programs" and "sub-programs." In common PPBS parlance, a "program" is considered to be "a set of activities organized or grouped to achieve a particular objective or set of objectives." Essentially, then, the major intent here is that district personnel identify and structure as programs all the activities or sets of activities which are necessary to the achievement of the district's defined set of philosophies, goals, and objectives. As a result, all school district activities--including both instructional and instructional-support activities--become organized, at least theoretically, in terms of desired school outputs rather than in terms of traditional organizational units or functions.

3. District personnel examine in detail the on-going activities within each program defined, and they identify the actual and desired inputs, processes, and outputs of each activity and so of the total program of activities.

4. Where it is possible to identify significant differences between the actual and desired characteristics of the various programs defined--their inputs, processes, and outputs--district personnel

generate alternative programs or alternative strategies (activities) within programs which, if implemented, might achieve the desired outcomes with increased efficiency and effectiveness.

5. Employing techniques associated with benefit-cost analysis and cost-effectiveness analysis, district personnel analyze and evaluate each of the generated alternatives in terms of their anticipated or predicted inputs, processes, and outputs. To the extent possible, analyses are expected to be quantitative and comparably-based, for, ultimately, district personnel must select from the alternatives generated those particular programs and program strategies which can be implemented with the greatest probability of success.

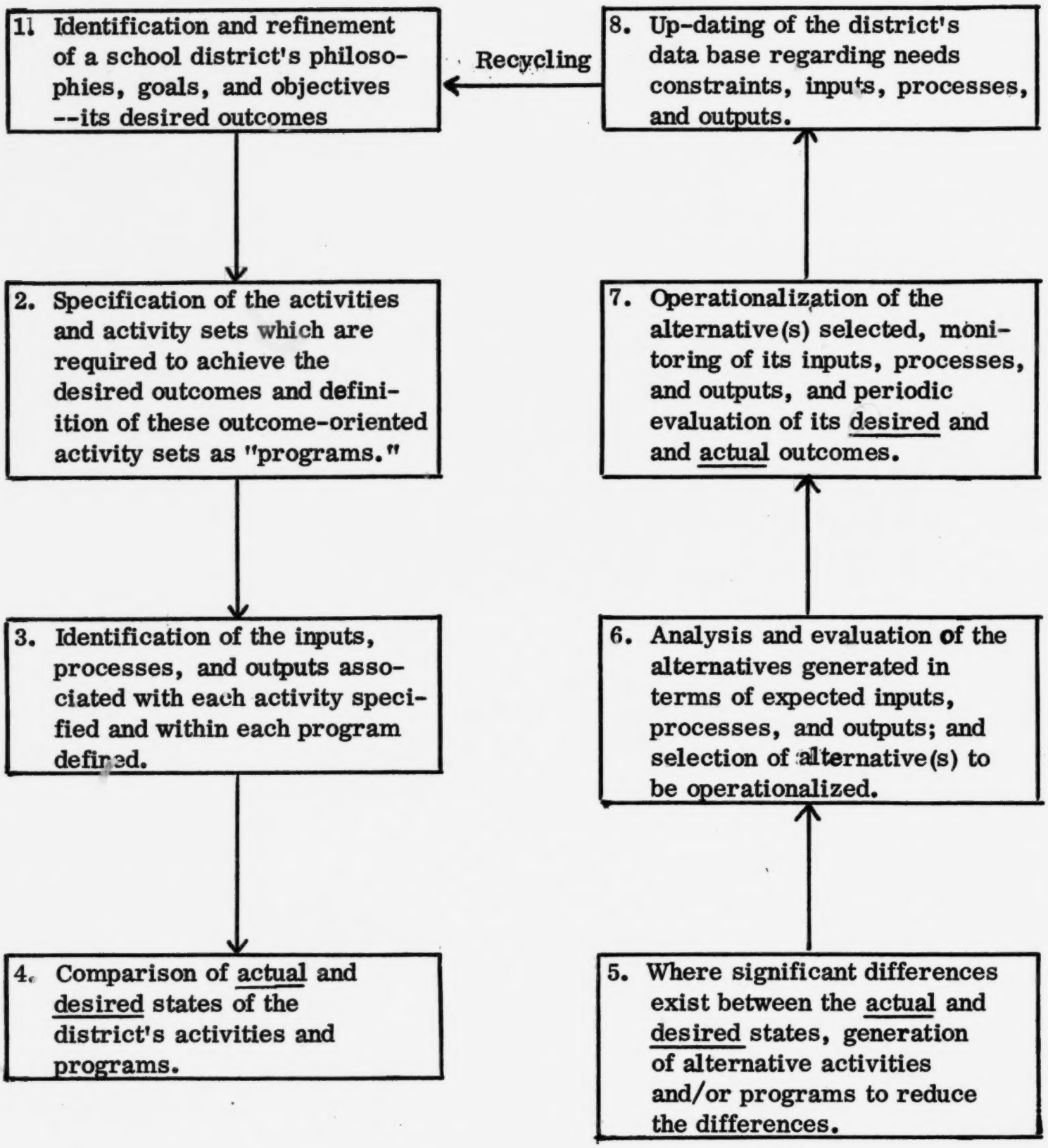
6. District personnel operationalize the alternatives selected, monitor their performance (their inputs, processes, and outputs), and periodically evaluate their outcomes in terms of the originally-defined school district goals and objectives and the expected program outcomes.

7. Finally, through carefully structured cybernetic channels, district personnel analyze carefully the evaluative data obtained, up-date their data base of information related to inputs, processes, and outputs, and then recycle the entire sequence, starting with the further refinement of philosophies, goals, and objectives and proceeding through all steps outlined to the final evaluation of implemented program alternatives.

Figure 1 depicts in flow-chart form this usual conceptualization of PPBS. Through the replication of the cycle throughout a school district, educational decision-makers are expected to become increasingly oriented to educational outputs, increasingly able to justify the continuation or elimination of particular school district programs, and increasingly interested in generating alternative ways to accomplish school district goals and objectives.

Figure 1

The Usual Conceptualization of PPBS


1. Identification and refinement of a school district's philosophies, goals, and objectives --its desired outcomes
Recycling
8. Up-dating of the district's data base regarding needs constraints, inputs, processes, and outputs.
2. Specification of the activities and activity sets which are required to achieve the desired outcomes and definition of these outcome-oriented activity sets as "programs."
7. Operationalization of the alternative(s) selected, monitoring of its inputs, processes, and outputs, and periodic evaluation of its desired and and actual outcomes.
3. Identification of the inputs, processes, and outputs associated with each activity specified and within each program defined.
6. Analysis and evaluation of the alternatives generated in terms of expected inputs, processes, and outputs; and selection of alternative(s) to be operationalized.
4. Comparison of actual and desired states of the district's activities and programs.
5. Where significant differences exist between the actual and desired states, generation of alternative activities and/or programs to reduce the differences.

The Pressure to Adopt PPBS in Public Education

The use of PPBS as a planning and management technology in public education is a very recent development, certainly within the last decade and for most school districts within the last two or three years. Program budgeting, which is actually only one aspect of a total PPBS operation, became nationally prominent as a result of the now famous--or infamous--Presidential directive of August 25, 1965 which called for the introduction throughout the Federal government of a new planning-programming-budgeting system. This comprehensive step in governmental decision-making was a direct outgrowth of the apparent success of program budgeting which had been introduced by Secretary Robert McNamara in the U. S. Department of Defense in 1961.

As program budgeting and other PPBS-related techniques have become, at least theoretically, integral parts of the Federal government's decision-making process during the last five years, their potential application at other levels of public administration--state, regional, and local--has become more and more apparent. In terms of public school districts, the pressure to develop PPB systems has now reached considerable intensity. With increasing frequency, state legislatures have actually mandated or are in the process of mandating that public school districts adopt program budgeting and PPBS-related techniques and processes in their administration procedures. William H. Curtis of the Research Corporation of the Association of School Business Officials has on a number of occasions made the claim that "According to the latest

information we have and from what we consider a reliable source . . . it would seem that upwards of three-quarters of the States of this Nation, through their legislatures, are either considering some kind of a pattern of PPBS at the state level or have already mandated this process."[3]

This pressure upon school districts to develop and adopt PPBS-related technologies results from the interaction of several recent developments in and out of public education. First, on a primarily theoretical level, recent writings on the economics of education suggest clearly that it is now possible to develop a variety of mathematically-based techniques for increasing the rationality of economic decision-making. Second, the demand and competition for public monies to support public activities is increasing disproportionately to the availability of reserve resources. More particularly, the expanding function of education in the solution of a variety of social problems places increasing demands upon available public funds at a time when the resources available for public education, particularly in the nation's largest cities, are in a more critical state than ever in history.

Third, closely related to the disparity between economic supply and demand is the increasing need for evaluation of how public monies are being used. Because of the recent expansion of public service programs throughout

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[3]The Research Corporation of the Association of School Business Officials, Report of the First National Conference on PPBES in Education (Chicago: The Association, 1969), p. 33.

the nation--in such areas as education, welfare, housing, and health services--and the resulting competition among such programs for the public's financial support, it is more and more essential that each program be able to produce evidence that it can and has achieved it objectives. Fourth, public education is well into a period of extensive experimentation with a variety of new teaching methods and materials. If continuation and transfer of these educational innovations is to have any legitimacy, it is important that educators evaluate in economic terms the comparative costs and benefits of the various methods and materials tested. And finally, the technological explosion makes more possible than ever before the systematic collection and analysis of data relevant to the inputs, processes, and outputs of an educational organization.

A Selected Review of Current Efforts to Implement PPBS in the Public Schools

Throughout the United States in 1970, there exists a significant number of on-going projects related to PPBS. Unfortunately, however, there is little coordination among these projects and no single source which can provide comprehensive information about what various school districts, professional organizations, and related educational centers are doing to foster PPBS and output-oriented planning in education. Lacking, therefore, a centralized clearinghouse for information about PPBS, most information about on-going PPBS projects can be obtained only haphazardly and primarily by word of mouth.

Despite these limitations, we shall attempt to survey very quickly a

selected few of the major on-going PPBS projects which appear to us to be most significant. Figure 2 provides a generalized framework for viewing and relating these current efforts, for it suggests the possible purposes and content areas which may be relevant to a given project.

1. The Research Corporation of the Association of School Business Officials

For two years, the Research Corporation of ASBO has been attempting to "develop the conceptual design for an integrated system of planning, programming, budgeting and evaluation."[4] Supported by an Office of Education grant, the ASBO effort has to date included the development of an initial design, the presentation of that design to a wide variety of practicing school administrators and university personnel, and the collection of reactions to and suggestions for revision of the design. At the moment, ASBO staff members are involved in the revision and expansion of the original design in terms of the information obtained during the conferences. The final product of the project, expected later this year, will be a document or text which presents the revised "conceptual design for educational resource management," a glossary of relevant terms, a current bibliography, and "elaborations of the conceptual design and illustrative materials to aid school districts in preparing for systems of educational resource management."[5] When completed, the final document will be disseminated to the field by means of conferences, workshops, and mailings.

In terms, therefore, of Figure 2, the ASBO project represents essentially an effort to conceptualize and disseminate at the level of awareness a model or design for PPBS.

2. Dade County Public Schools, Florida

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[4]"Proposal for Developing Program Planning-Budgeting-Evaluation System Design," a proposal for research and related activities submitted to the Office of Education by the Dade County Public Schools and the Research Corporation of the Association of School Business Officials (1969), p. iii.

[5]Ibid., p. 28.

Figure 2

A Framework for Viewing Current PPBS Projects in Public Education

PROJECT CONTENT

PROJECT PURPOSES	A Model or Design for PPBS	The Operational Elements of PPBS	The Strategies for Implementing PPBS
To Conceptualize			
To Test			
To Disseminate and Develop Awareness			
To Disseminate and Develop Competence			

In conjunction with the ASBO effort to develop a conceptual design for PPBS, the Dade County Public Schools have been attempting during the last two years to develop "the operational design for an integrated system of planning, programming, budgeting and evaluating."[6] More specifically, supported also by a grant from the Office of Education, Dade County has been attempting to operationalize portions of the ASBO design. To date, however, the relationship between ASBO's conceptual design and Dade County's operational elements is not entirely clear. At this point, Dade County has identified at a gross level its primary activity sets or programs, has attempted to identify the total costs of these programs, and has defined several measurable objectives for each of the administrative programs identified. The development of a cost-accounting system, the definition of specific objectives for the district's instructional programs and subprograms, and the systematic identification of alternative processes or strategies for achieving desired outcomes--all remain ahead in Dade County's effort to operationalize PPBS.

In terms, therefore, of Figure 2, Dade County is attempting to conceptualize and test selected operational elements of a PPB system.

3. The ASBO Pilot Districts: Clark County (Las Vegas), Nevada; Douglas County, Colorado; Herricks-New Hyde Park, New York; Memphis, Tennessee; Milwaukee, Wisconsin; Montgomery County, Maryland; Peoria, Illinois; and Westport, Connecticut.

During the first year of the ASBO-Dade County project, it was decided to involve eight additional school districts in the project on a pilot basis. Several reasons lay behind this decision, chief of which were "the need for knowledge and experience represented by the personnel of school districts of various sizes and political organizations to secure diversified opinions" and "the need to broaden the base of research manpower needs beyond the limits of Dade County."[7] To date, none of these eight pilot districts has actually developed and implemented more than limited pieces of the ASBO conceptualization.

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[6] Ibid., p. iii.
[7] Ibid., p. 15.

Of the eight pilot districts, Westport has probably made the greatest progress toward operationalizing the ASBO design, but Westport personnel readily admit that they have just begun the lengthy and complex process of developing a fully operationalized PPB system. At the moment, Westport is finalizing a statement of community-developed school district goals and objectives, developing a program structure of on-going activities, preparing a budget which presents expected costs in terms of identified programs, identifying techniques for measuring instructional outcomes, and developing a way to relate subject matter objectives to the broad school district goals already defined by representatives of the community.

In terms, therefore, of Figure 2, the ASBO pilot districts are involved to varying degrees in an effort to conceptualize and test particular operational elements of PPBS.

4. Public School Districts in Skokie, Illinois, Darien, Connecticut, and Pearl River, New York

All three of these school districts have been involved during the last two years in the development of some part of a PPBS operation. For the most part, the process for all three districts has been one of identifying existing school district activities, defining these as programs, and then developing a cost accounting system which will periodically present cost data in terms of the programs identified. Though their program structures and data collection procedures vary, each of the three districts is now able to obtain on a regular basis a series of computer printouts which display all school district costs in terms of the individual programs identified in the program structure. Eventually, each of the districts expects to be able to identify the specific outcomes of the identified programs, so that school personnel can begin to engage in more sophisticated input-output analyses and planning techniques.

In terms, though, of Figure 2, these three school districts are currently involved in conceptualizing and testing one particular operational element of a PPB system--a cost-accounting system which is keyed to school district programs.

5. The School District of Philadelphia

For the last three years, the Philadelphia public schools have been working toward a PPBS operation in an effort to bring the goals

and priorities of the district to bear upon "the often painful process of reallocating resources within and among existing programs."[8] This year, for the first time, district principals are responsible for developing an individual budget document which reflects clearly not only the inputs or dollars desired for next year, but also the expected uses of those resources, their expected outcomes, and the relation of those expected outcomes to the district's overall goals and objectives. More specifically, for the 1970-71 fiscal year, principals were asked to do the following: first, to select three or fewer of the school district's goals which would receive the greatest amount of time, attention, and/or funds during the current and next school year; second, to define measurable objectives related to those goals selected and to indicate for each objective the level of performance desired; third, to identify the resources required to operate the school, including both those absolutely necessary and those which might be reallocated; and fourth, to generate, cost out, analyze, and select alternative uses of the reallocatable resources available in an effort to achieve with greater effectiveness the particular objectives defined and, thereby, their related goals. Presumably, then, the 1970-71 budget for the Philadelphia school district will clearly reflect this effort to plan, program, and budget fiscal resources on a school-by-school basis and in terms of broad school district goals and objectives.

In terms, therefore, of Figure 2, the School District of Philadelphia appears to be conceptualizing and testing several operational elements and techniques which are critical to PPBS--identification of goals, objectives, and priorities, identification of desired inputs, and generation and selection of alternative patterns of resource allocation.

6. Governmental Studies Center, Fels Institute of Local and State Government, University of Pennsylvania

In cooperation with a number of local and county school districts around Philadelphia, the Government Studies Center has been engaged for well over two years in the development and implementation of a general design for an educational PPBS. The overall

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[8]The School District of Philadelphia, Planning Programming Budgeting Guide: 1970-71 (Philadelphia: 1969), p. 4.

purpose of the project, which has been partially funded by the Office of Education, has been "to develop management tools for use by the administrators and boards of intermediate units and local school districts. Specifically, the study includes the design, testing, and initial implementation of a planning-programming-budgeting system which will allow for a coordinated effort in the providing of educational services by the local districts and intermediate units."[9] To date, the outputs of this project consist primarily of two sets of voluminous manuals which present in detailed form a variety of techniques for developing at both a local and county level the following major elements in a PPBS operation: input forecasts of students and revenues, program structures, indicators of major controllable variables, operational forecasts of program implementation, multi-year plans, multi-year programs, and budget documents. For the most part, this particular project deals with decision-making and budgetary considerations at a relatively macro-level of analysis.

In terms of Figure 2, however, the Government Studies Center project represents an effort in one particular area of the country to conceptualize, test, and disseminate a number of operational elements related to PPBS as well as a particular strategy for implementing those elements.

7. Project 5001 -- The Center for the Advanced Study of Educational Administration

CASEA is one of the nine federally-supported research and development centers in education. Project 5001 within CASEA has as its ultimate goal the production of an instructional package or set of instructional experiences which will prepare school personnel to design, adopt, and operate PPBS in their schools or school districts. A preliminary step to this production of an instructional package is, of course, the synthesis of the now extensive but disparate body of knowledge related to PPBS and the development of new knowledge related to the conceptual and operational elements of PPBS and related output-oriented management technologies. Within a year,

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[9] General Design for An Education Planning-Programming-Budgeting System (Philadelphia: Government Studies Center, Fels Institute of Local and State Government, University of Pennsylvania, 1968), p. iv.

> the CASEA staff will have ready for wide dissemination an instructional package of materials--didactic presentations, visuals, and an extended simulation--which can be used in an instructional setting to teach practicing school administrators what PPBS is all about and how it can be implemented as a first step in the process of developing a systems approach to organizational planning.
>
> Essentially then, in terms of Figure 2, the CASEA project represents an attempt to conceptualize and disseminate in the form of instructional materials a carefully-designed strategy for implementing PPBS--a strategy which is derived from a clearly-stated conceptual model and which attends in detail to the operational elements of a PPBS operation. Most important, the CASEA project has as a primary objective the development not only of knowledge, but of competencies and attitudes as well.

These seven major projects do not represent an exhaustive list of current efforts to adapt the principles of PPBS to public education. They do, however, represent the major projects of which we are aware, and they suggest clearly that no school system in the country has developed a fully-operationalized PPB system.

A Glossary of Selected Terms

One of the major difficulties faced in any discussion of PPBS or educational planning is the ambiguity of terms used. There are, unfortunately, at the moment few standard definitions for PPBS-related terminology. Consequently, rather than attempt to provide a generalized glossary for PPBS, we have chosen to define only those terms which are particularly relevant to this specific discussion of PPBS and data-based planning, and, moreover, we have chosen to define the terms selected as they have been used in this particular discussion. As a result, the definitions given may or may not be valid in other contexts.

For purposes of clarity, the terms defined have been deliberately grouped:

1. Planning may be thought of as being simply future-oriented decision-making. Throughout this discussion, however, we have attempted to distinguish between two kinds of planning:

   a. input-oriented planning is that kind of planning which is concerned with making decisions for the future about existing organizational processes and the inputs required to carry out those processes; and

   b. output-oriented planning is that kind of planning which is concerned with desired organizational outputs and with identifying ways to manipulate organizational processes and inputs so as to better achieve those outputs.

2. Any organization may be characterized by its processes, inputs, and outputs:

   a. its processes consist of the set of physical, interpersonal, and procedural arrangements which may be thought of as activities, functions, or programs and which are carried out within an organization to achieve its objectives;

   b. its inputs are the costs in dollars of providing the manpower, facilities, equipment, and materials required to carry out the organization's processes; and

   c. its outputs are the products or outcomes of the organization's processes and typically represent observable, measurable changes in the behavior or performance of people, things, or processes.

3. The inquiry function and so the decision-making function of any goal-directed system or organization may be one of three closely related kinds:

   a. designative inquiry concerns the system's environment and the relationship of the system to the environment. The object of designative inquiry is the discovery of properties, characteristics, relationships encoded as statements of fact, principle, or law that characterize the physical, biological, and social nature of the system's environment. As used in this discussion, designative inquiry deals with the question "what is?" and so results in descriptive statements about the actual state of the system;

b. appraisive inquiry yields the specification of values, preferences, and goals that characterize the system itself. As used in this discussion, therefore, appraisive inquiry deals with the question "what is preferred?" and so results in descriptive statements about the desired state of the system; and

c. prescriptive inquiry is given to the formulation of plans, interventions, and operations to be performed when the system is confronted with or detects intolerable discrepancies between what is the case (the product of designative inquiry) and what is preferred (the product of appraisive inquiry). As used in this discussion, therefore, prescriptive inquiry deals with the planning process itself--the identification of discrepancies and the generation, testing, selection, implementation, and evaluation of alternative means for reducing those discrepancies.

4. Throughout most of this discussion, the terms program and activity are used interchangeably to refer to specific organizational processes carried out to achieve the organization's goals and objectives. In the CASEA Approach to implementation, presented in Part Four, these two terms take on more precise definitions:

   a. activities are still processes carried out in an organization, but in the CASEA Approach both they and their inputs must be clearly definable; and

   b. programs are still processes carried out in an organization, but in the CASEA Approach they are sets of activities carried out to achieve particular objectives for which there exists specific information regarding both the inputs to and the outputs from those activities. Moreover, in the CASEA Approach, there are two kinds of programs which can be identified:

      (1) operating programs are programs which consist of actual, on-going school district activities, each with its specific inputs, processes, outputs, and objectives; and

      (2) intellectual programs are programs which exist only conceptually and which serve as a bridge or crosswalk between the district's most general aims and goals and its operating programs.

For definitions of the more general PPBS terminology, refer to the outside sources included in the bibliography in Part Five of these materials.

Part Two: A Systems Model for Educational Planning

In this second part, we will deal in considerable depth with the basic concepts underlying a systems model for educational planning, a model which takes into consideration and requires information about a set of processes, the inputs of those processes, and the outputs from them. We will explicate in detail three interrelated models--one relevant to educational organizations, one relevant to decision-making, and one relevant to educational planning. Then in Part Three we will relate these three systems models to PPBS and refine our earlier conceptualization of it.

A Basic Systems Model of An Organization

Underlying any PPB system is a very simple and well-known way of viewing an organization--the input-output or "black box" model which is commonly depicted as follows in Figure 3. In terms of PPBS, this model is particularly

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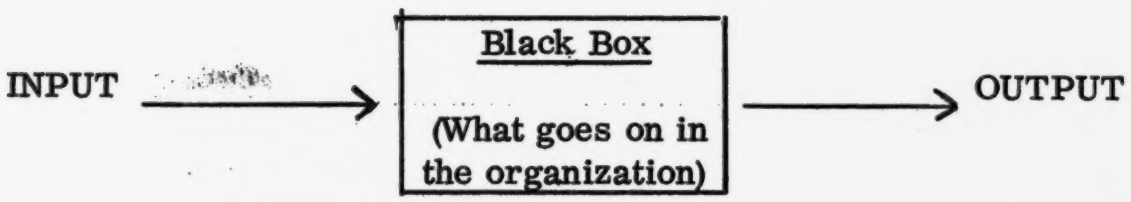
Figure 3

The Input-Output Model of An Organization



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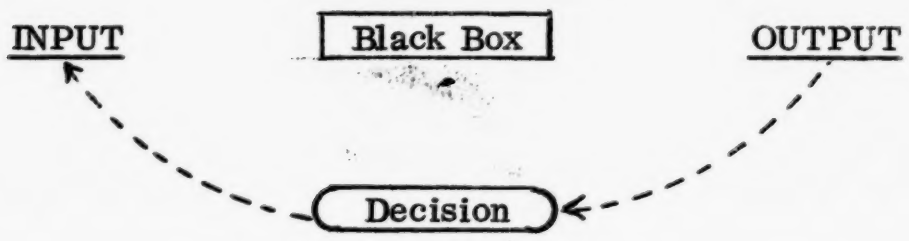
useful, for it clearly distinguishes among the major fundamental parts of an organization, and this need to distinguish among inputs, processes, and outputs is fundamental to PPBS.

Although the "black box" model has only limited value for organizational decision-making, input-output analyses based on the model can be applied fruitfully in an organization to several limited kinds of planning decisions. For instance, even in its simplest form, where the processes of the organization are considered to be unknowns--hence the term "black box"--it is quite possible to alter inputs and then determine the effects of such alterations on the outputs. For example, a school administrator might decide to increase the money allocated for the teaching of second grade reading and then, over time, he could measure the effects of those increased inputs upon the Stanford test scores (or any other measure of outputs) of second graders--without ever considering how the increased resources were actually used. As the administrator collects data over time on the relationships between inputs and outputs, he is able to use that accumulated data to make new judgments about the inputs that will be required to achieve desired outputs. Thus, with one minor refinement of the "black box" model, the model can provide a framework for some limited kinds of organizational planning. As depicted in Figure 4, this refinement consists of a feedback loop which indicates that variations in inputs over time are determined by information about the effects of prior inputs upon desired outputs. And with that added feedback loop, the simple "black box" model becomes a simple schema for organizational

Figure 4

Input-Output Model Incorporating Feedback



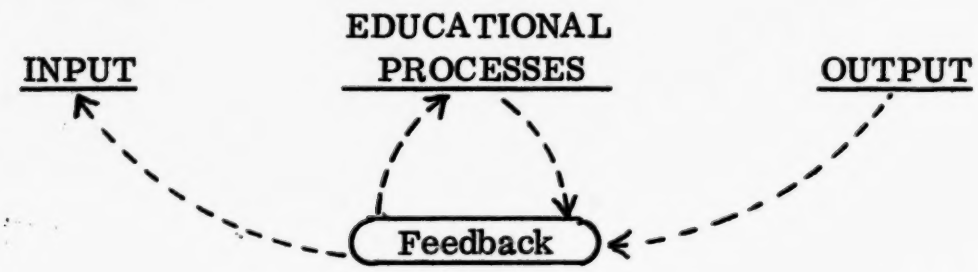
decision-making.

Few school administrators, however, would be satisfied to manipulate the resources allocated to various educational activities solely on the basis of the measurable outputs produced while completely ignoring the educational process. Therefore, a PPB system for schools must attend not only to inputs and outputs, but to processes as well. The "black box" must be opened and attention given to the educational processes which the inputs support and which in turn produce desired educational outcomes among students. As Figure 5 indicates, a further refinement of the model is now needed, for the administrator must now receive information about the processes involved as well as information about the relationships between specified inputs and measured outputs.

With this new information about processes, the decision-maker is now in a position to consider holding inputs constant and modifying processes as a means of affecting outputs. This new power introduced by opening the "black

Figure 5

Model Incorporating Organizational Processes



box" is not, however, gained without considerable expense, for what began as a relatively simple organizational model has now become quite complex. Returning to our earlier example, the school administrator who decides to increase resources or inputs allocated to second grade reading has increased the complexity of his task several times, for he must now ascertain how this increase in resources will modify the process of teaching second grade reading and then he must determine the effect of this modified process upon measured changes in the reading performance of students. Moreover, even if successful in gathering the necessary process and output data, the administrator is still left to wonder if alternative processes obtained with the same resources might have had a still different effect upon student performance.

A Systems Model of Decision-Making

In the previous section, we moved from a relatively simple input-output

or "black box" model of a school as an organization to a more complex, but hopefully more realistic model of an educational organization. Throughout that previous section, the process of decision-making was alluded to several times, but never was that process itself fully unpacked. Surely if PPBS as a planning technology is to have any value, the organizational model already presented must be complemented by a compatible decision-making model. Some explication of a systems model for decision-making therefore follows.

A most heuristic systems model for decision-making has been described by Brissey, Fosmire, and Hills.[10] The model, depicted in Figure 6, provides

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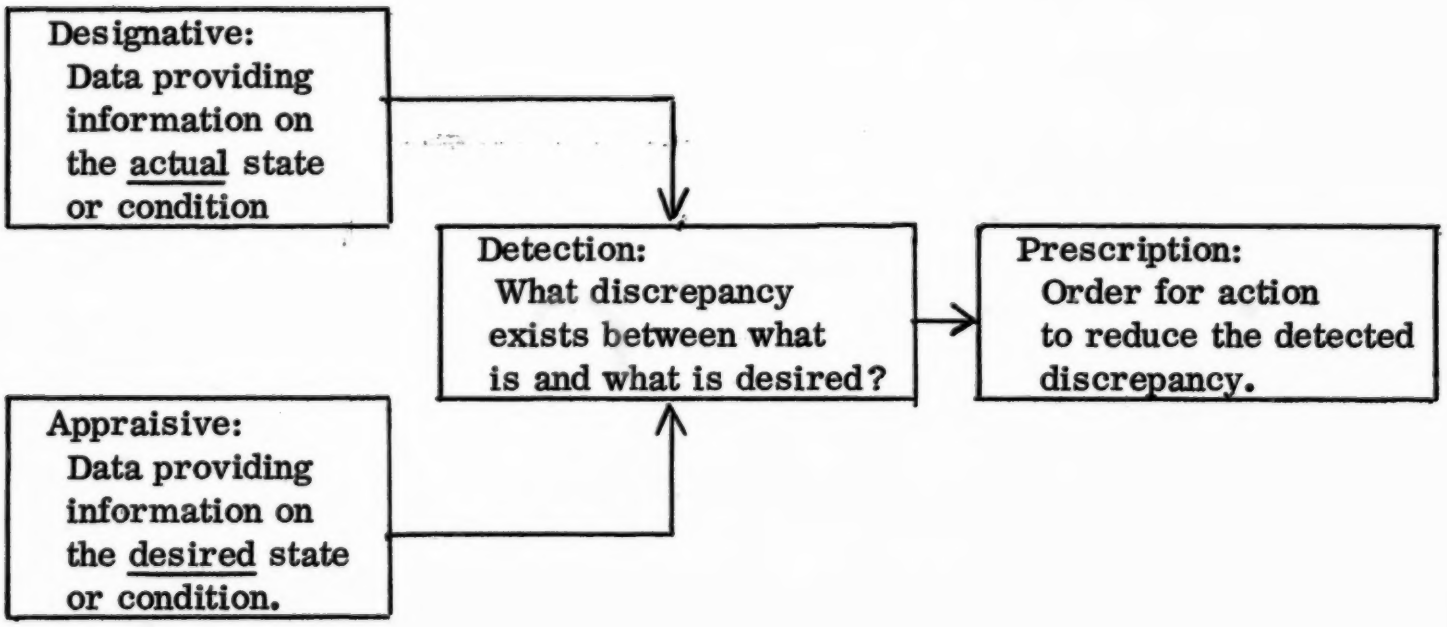
Figure 6

A Systems Model for Decision-Making


Designative:
Data providing information on the actual state or condition
Detection:
What discrepancy exists between what is and what is desired?
Prescription:
Order for action to reduce the detected discrepancy.
Appraisive:
Data providing information on the desired state or condition.

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[10] F. L. Brissey, F. R. Fosmire, and R. J. Hills, Technical Report: Problems, Problem-Solving and Human Communication, A Laboratory Approach to Training in Interpersonal Communication, Prepared for the Directorate of Information Sciences of the Air Force Office of Scientific Research and The Center for the Advanced Study of Educational Administration (February, 1969), pp. 10-18.

a framework for gathering data relevant to a decision and displaying those data in a useful format. In addition to fitting the requirements of the organizational model proposed earlier, this particular decision-making model explicitly involves the decision-maker's values in the decisioning process, a characteristic which makes it especially applicable in educational decision-making. To apply this model in decision-making requires that the decision-maker obtain two kinds of data: data on the actual state or condition about which he is concerned (designative data) and data on the desired state or condition (appraisive data). When both designative data ("what is") and appraisive data ("what is desired") have been gathered and can be explicitly presented, then the decision-maker must identify discrepancies between the two kinds of data and must decide whether or not he wishes to prescribe some course(s) of action to reduce those discrepancies identified. If so, he must identify, analyze, and select an alternative course(s) of action which will meet existing constraints and at the same time reduce the discrepancy between "what is" and "what is desired."

To illustrate the application of this decision-making model, we can return to the earlier example of the school administrator who is interested in his school's second grade reading activities. Using the systems model for an organization presented earlier, the administrator collects data relevant to three components of the system: (1) the inputs or resources allocated to the reading activities; (2) the processes or instructional activities which these resources support; and (3) the outputs or measured changes in students' reading performance produced

by those processes. Since the administrator collects these data in terms of an actual, on-going school activity, he classifies them as designative data, for they reflect conditions which actually exist.

According to the decision-making model presented in Figure 6, however, designative data represent only one kind of data required by the decision-maker. For to engage in prescriptive inquiry--in planning--the administrator must also generate appraisive data relevant to the second grade reading program. That is, having asked "what is?" he must now ask "what is desired?" His statements of desired inputs, processes, and outputs are, however, constrained in several ways. First, he must be certain to explicate his desires with regard to all three components of the organization--inputs, processes, and outputs. Second, these statements of preference must be phrased in such a manner that they can be observed in the real world of his school; that is, the appraisive data generated by the administrator must have correlates in the measurable, observable world of designative reality. Third, there are practical constraints which militate against choosing certain inputs, processes, and outputs as desirable. For example, it would be neither feasible nor sensible to allocate 90 percent of a school's total budget to second grade reading or to desire an increase of eight grade-levels in students' reading performance from one school year of instruction. And finally, because the ultimate purpose of educational planning is to improve the education of students, this overriding focus upon students imposes a major constraint upon planning and so upon appraisive inquiry: regardless of

how inherently pleasing a certain allocation of resources or a specific instructional process may be, both input and process objectives must be kept subservient to desired educational outcomes or outputs. Consequently, our exemplary school administrator would be well advised, first, to decide upon what outcomes are desired of second grade reading and, then, constrained by these objectives, to plan a desirable instructional process and allocation of resources to achieve those particular objectives. Limited by the foregoing and other real-world constraints, the administrator develops, therefore, a set of appraisive statements which reflect his desires or preferences concerning the inputs, processes, and outputs for his school's second grade reading activities.

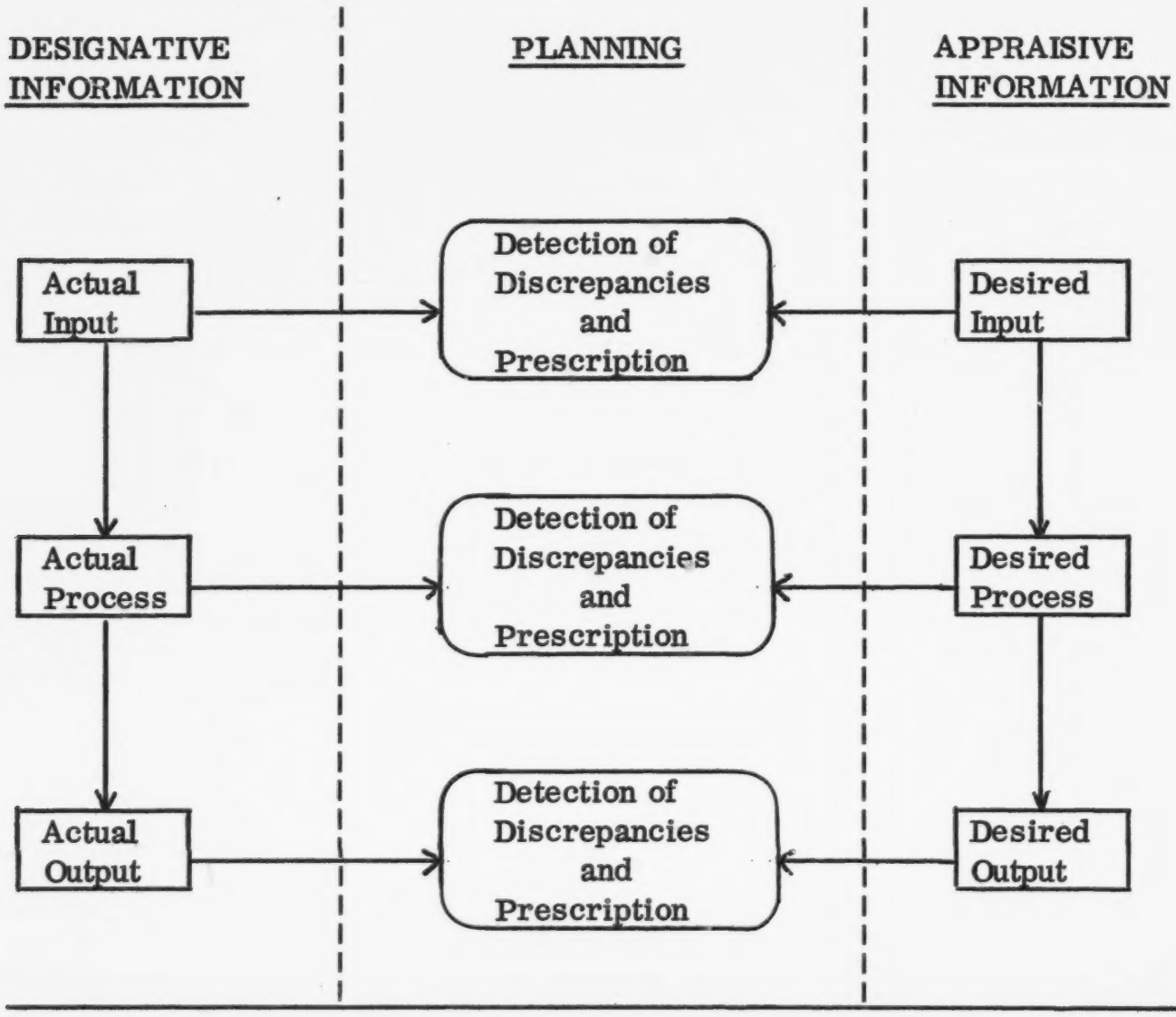
Armed now with both designative and appraisive data bout the inputs, processes, and outputs of second grade reading, the administrator is prepared to embark upon data-based planning. That is, he now has reliable data regarding what actually exists and what he wants to have exist, and he is now ready to use this information as a basis for planning--as a basis for detecting discrepancies and prescribing for their reduction.

A Systems Model for Data-Based Organizational Planning

At this point, we are ready to explicate a systems model for organizational planning which integrates (1) our systems model of an educational organization and (2) our systems model of decision making. In static form, the planning model is depicted in Figure 7. Later in Figure 8, we will add the

Figure 7

A Static Model of the Planning Process



variable of time to the model.

For the moment, however, note that Figure 7 identifies the six data or information files which are required for planning and which allow the planner to make comparisons between the actual and desired states of each of the three critical components of the organization, its inputs, processes, and outputs. That is, Figure 7 identified in static form the kinds of information necessary for

planning and indicates a scheme for detecting discrepancies which can hopefully be reduced through careful prescriptive inquiry.

Unfortunately, this static model of the planning process is insufficient for several reasons, in addition, of course, to the fact that it excludes time and so defies the real world. First, it seems to suggest that the inputs, processes, and outputs of an organization are independent of each other, when in fact they are highly interdependent. That is, outputs are affected not only by inputs and not only by processes, but also by the interaction of those inputs and processes. If a discrepancy between desired and actual outputs is detected, the prescription designed to reduce this discrepancy may involve a modification only of processes or only of inputs, but it is much more likely to involve an interrelated change in both inputs and processes.

And a second major weakness of this static model is the fact that it does not emphasize the output-orientation which ought to characterize educational planning. That is, the model suggests that a planner can focus the planning process upon any of the three components of the organization, inputs, processes, or outputs. With equal value, he can attempt to reduce input discrepancies, process discrepancies, or output discrepancies. In fact, however, as we suggested earlier, there exists in schools a hierarchical set of priorities which dictate that reducing or eliminating discrepancies between actual and desired educational outputs is ultimately the only legitimate goal of educational planning and that manipulating inputs and processes is only a means to achieving that end,

not an end in itself. After all, schools are created and maintained by society as purposive organizations whose overriding goal, at least implicitly, is that of effecting changes in students' mental, physical, and social behavior. Educational planning must, therefore, be oriented to educational outputs and must subordinate desires for process and input to those desired outputs. It may be pleasing to create a beautiful educational process, but, if that process does not in operation produce desired educational outcomes, then its continuance can hardly be justified.

In the static model presented in Figure 7, several assumptions were implicit: first, that at some prior time a set of organizational activities were identified to be considered for planning; second, that empirical data were collected over some period of time regarding the actual inputs, processes, and outputs of those activities; and third, that appraisive data were also collected regarding the desired inputs, processes, and outputs of those activities. When we now introduce time into the model, as depicted in Figure 8, we find that the collection of this designative and appraisive data occurs in a definite sequence and that we can illustrate the manner in which information about prior events provides feedback data for planning.

The dynamic planning model depicted in Figure 8 assumes that planning is to be implemented for some set of activities (sub-system) which are already taking place in an on-going organization (system). Since an identifiable set of activities already exists, planning is initially implemented by collecting empirical data over some period of time regarding the inputs, processes, and outputs

relevant to this set of activities. Thus, the initial data files on actual inputs, actual processes, and actual outputs for some existing set of activities are specified and serve as a starting-point for data-based planning efforts.

Note also that the data collected throughout the planning process feed into the organization's data bank or information system where they become available for use in future decision-making. The broken line connnecting the "actual" and "detection" boxes is shown only to emphasize the fact that these designative data are especially relevant to the continuity of a data-based planning system. However, as the brackets on the left indicate, information about <u>all</u> events of planning and action feeds into the data bank and, as indicated by the brackets on the right side of the figure, data can be withdrawn at any time for use in subsequent planning.

To clarify the dynamics of this systems model for educational planning, it seems wise to "walk through" the planning process with our intrepid school administrator who wishes to apply output-oriented, data-based planning to the second grade reading activities in his school. The "walk through" consists of an initial implementation phase followed by cycles of operation and planning phases.

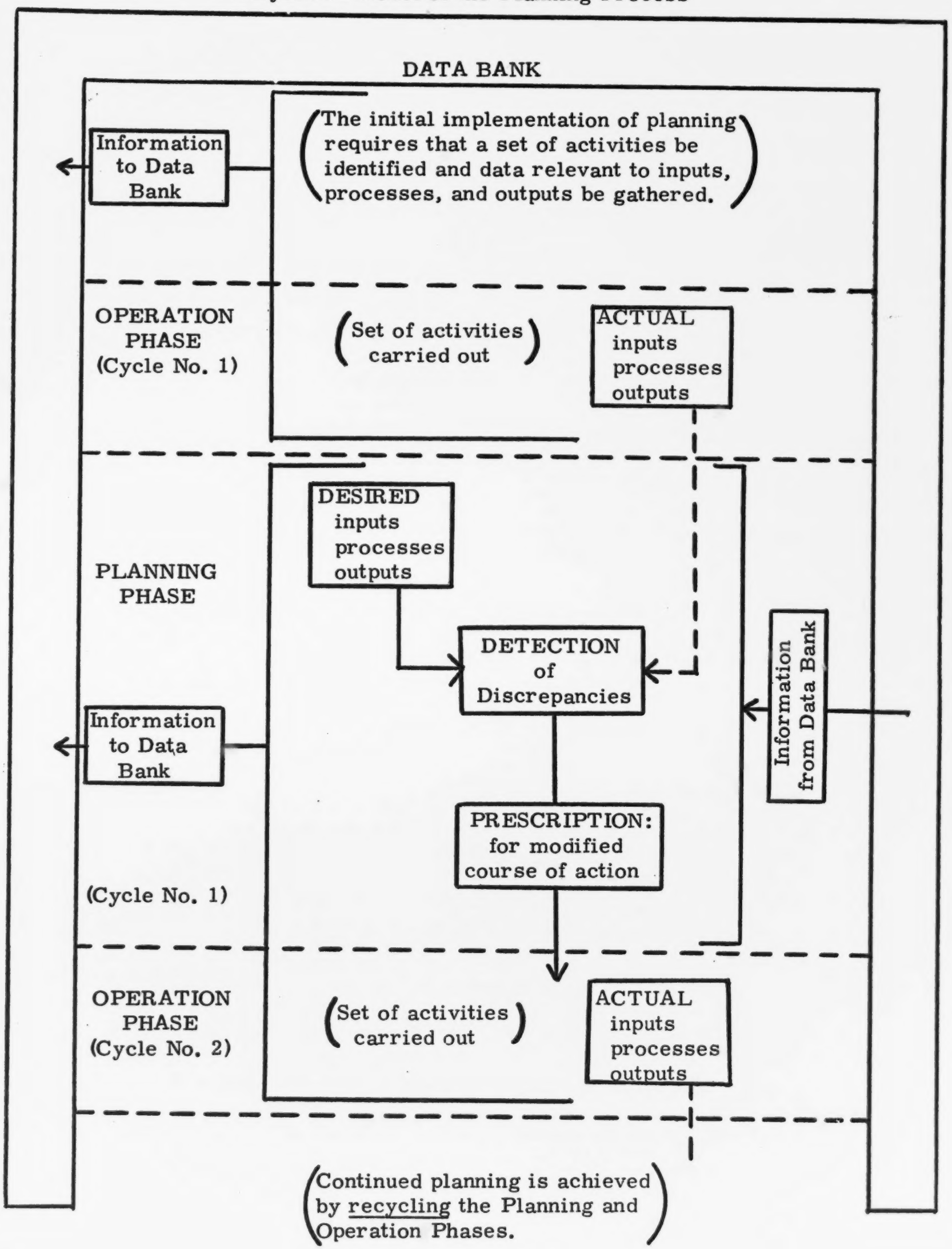
A "Walk Through" of the Planning Process

Initial Implementation Phase (Summer, 1970)

Step 1: The set of activities related to reading instruction in second grade is identified.

Figure 8

A Dynamic Model of the Planning Process


DATA BANK
Information to Data Bank
The initial implementation of planning requires that a set of activities be identified and data relevant to inputs, processes, and outputs be gathered.
OPERATION PHASE (Cycle No. 1)
Set of activities carried out
ACTUAL inputs processes outputs
PLANNING PHASE
DESIRED inputs processes outputs
DETECTION of Discrepancies
Information to Data Bank
Information from Data Bank
PRESCRIPTION: for modified course of action
(Cycle No. 1)
OPERATION PHASE (Cycle No. 2)
Set of activities carried out
ACTUAL inputs processes outputs
Continued planning is achieved by recycling the Planning and Operation Phases.

Step 2: A procedure for recording data (observing, testing, etc.) relevant to the inputs, processes, and outputs of the reading program (set of activities) is established.*

Operation Phase - Cycle #1 (School Year 1970-71)

Step 1: Using the established procedure, data relevant to the inputs, processes, and outputs are collected.

Step 2: Designative information on the actual inputs, processes, and outputs is fed into the data bank.

Planning Phase - Cycle #1 (Summer, 1971)

Step 1: Using feedback from the prior Operation Phase and other information from the data bank desired outputs of the reading program for 1971-72 are decided upon, a process to provide these outcomes is selected, and inputs to support the process are established.

Step 2: Discrepancies between the inputs, processes, and outputs of 1970-71 and those desired in 1971-72 are detected.

Step 3: Using feedback from the prior Operation Phase and other information from the data bank a prescribed course of action for activities in the reading program is agreed upon and communicated to all concerned.

(Note: Information about the planning itself is also fed into the data bank.)

Operation Phase - Cycle #2 (School Year 1971-72)

Step 1: The prescribed activities are carried out.

Step 2: Designative information on the actual inputs, processes, and outputs is fed into the data bank.

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*Although different operational definitions of input, output, and process may be employed by different planners, the following definitions are suggested.

Input - the cost in dollars of providing personnel, facilities, supplies, and materials.

Process - the set of physical arrangements and pedagogical procedures employed in the instructional process.

Output - the observable, measurable changes in the physical and mental behavior of students.

Planning Phase - Cycle #2 . . . n

(Same as Planning Phase - Cycle #1)

Operation Phase - Cycle #3 . . . n

(Same as Operation Phase - Cycle #2)

Adaptation to Long-Range Planning

One requirement of a PPB system which we have not yet considered is long-range planning. In operating organizations, the actual changes which can be made from year-to-year are necessarily limited, and so major changes are most successfully and judiciously accomplished in an incremental fashion. That is, the total change desired is identified at some point in time and then this total change is accomplished incrementally by moving from the present in an evolutionary manner over a period of five or more years to the desired end. This evolutionary strategy, incidentally, is not a bad strategy for school districts to follow if they are interested in implementing PPBS.

The systems model for planning presented in Figure 8 can be easily adapted to this kind of incremental long-range planning. Once a set of activities has been identified as an area for planning and the initial data regarding the actual inputs, processes, and outputs have been collected, the educational planner may choose to identify his desired inputs, processes, and outputs for the identified activities on any time span horizon--three years, five years, or more. The only revision of the model necessary is the addition of one step in the

Planning Phase - Cycle #1, a step which calls for the establishment of goals for the planning process during the specified long-range time span. The planner can then implement his annual recycling of the planning and operation phases as described and monitor both the short-term objectives and the degree to which their accomplishment moves the system incrementally to the accomplishment of its relatively broader set of long-range goals and objectives.

Monitoring this interplay between long-range and short-range goals, plans, and objectives can be quite demanding. Long-range plans are of necessity in most cases much less specific and much less reliable than are short-range plans. Moreover, the more distant the time horizon established for a set of plans the more prone we are to ignore their existence or otherwise fail to accomplish them. And yet, both kinds of plans are needed. For activities carried out today, it is critical that there be short-range plans developed; but at the same time, short-range plans are meaningful only if they can be regarded as making some incremental contribution to some explicitly stated long-range desired state.

Conclusion

In summary, it seems worthwhile to retrace briefly the movement of ideas in this second part which have led to the final operational model for output-oriented, data-based educational planning. We began with a relatively simple input-output or "black box" model of an organization and developed from it a more complex model where attention was given to processes as well as inputs

and outputs. In addition, in both of these models, feedback was introduced as a means of making decisions which would affect organizational outputs. We then introduced a systems-oriented decision-making model which was eventually integrated with the refined organizational model to produce a static model of planning. By arraying the static model along a time continuum, we developed a dynamic, operational model for data-based planning. And finally, by making a minor modification in the dynamic planning model, we were able to introduce the distinction between short-range and long-range planning and suggest how accomplishment of the former can lead incrementally to accomplishment of the latter.

Part Three: A Refinement of the Originally-Presented Conceptualization of PPBS

In Part One, we presented a seven-step statement of the usual conceptualization of PPBS. In Part Two, we presented a series of systems models related to educational organizations, the process of decision-making, and the process of data-based planning. In this third part, we want to relate these three systems models to PPBS, refine the originally-presented conceptualization, and thereby provide a framework for our discussion in Part Four of possible innovation strategies for implementing PPBS.

Two Major Refinements

In light of the discussion presented in Part Two, there are two major refinements which can now be made in the original conceptualization of PPBS. One of these is to draw a sharper distinction between the process of collecting the information needed to operate a PPB system and the process of actually using that information to plan the future of a school district. In Part Two, we pointed out that planning is essentially a matter of future-oriented decision-making and that as such it requires a decision-maker to engage in three kinds of inquiry: designative inquiry to determine "what is," appraisive inquiry to determine "what is desired," and prescriptive inquiry to determine how to reduce discrepancies between "what is" and "what is desired." Engaging in designative and appraisive inquiry involves the decision-maker in collecting information whereas

engaging in prescriptive inquiry involves him in using that information to reduce discrepancies between the actual and desired states of the system. It seems important to us that any conceptualization of PPBS distinguish between these two processes of collecting and using information.

And as already intimated, a second major refinement which can now be made in the original conceptualization is to be more precise about the kinds of information which must be collected by the educational planner. Based upon the input-output organizational model and the decision-making model presented in Part Two, we can identify six kinds of information which are relevant to any data-based planning system: desired and actual INPUTS to the system (dollars), desired and actual PROCESSES of it (activities and/or programs), and desired and actual OUTPUTS from the system (measures of change in achievement, behavior, and operation). For once the educational planner knows with reasonable certainty the actual and desired states of the inputs, processes, and outputs of his school system and has a way of monitoring future states of the system in these terms, he is then in a position to plan rationally and make decisions which are clearly data-based. Consequently, it seems important to us that any conceptualization of PPBS distinguish among these six kinds of necessary data and indicate that a PPB system requires not only the development of an original bank of these data, but also the development of techniques for continually updating that data bank.

The Refined Conceptualization of PPBS

The refined conceptualization of PPBS, depicted graphically in Figure 9, can now be outlined as follows:

I. Collection of Information Necessary to Operating a Data-Based Planning System.

A. District personnel engage in designative inquiry and develop a data bank of information related to the actual states of the system--its inputs, its processes, and its outputs.

1. District personnel identify the actual processes--activities and/or programs--occurring the school district. As used here, processes include both instructional and instructional-support activities, they tend to mirror the district's current organizational functions and/or units, and they can be disaggregated to varying levels of specificity.

2. District personnel identify the actual inputs which are associated with each of the actual processes identified in the district--that is, the costs of the district's on-going activities and/or programs.

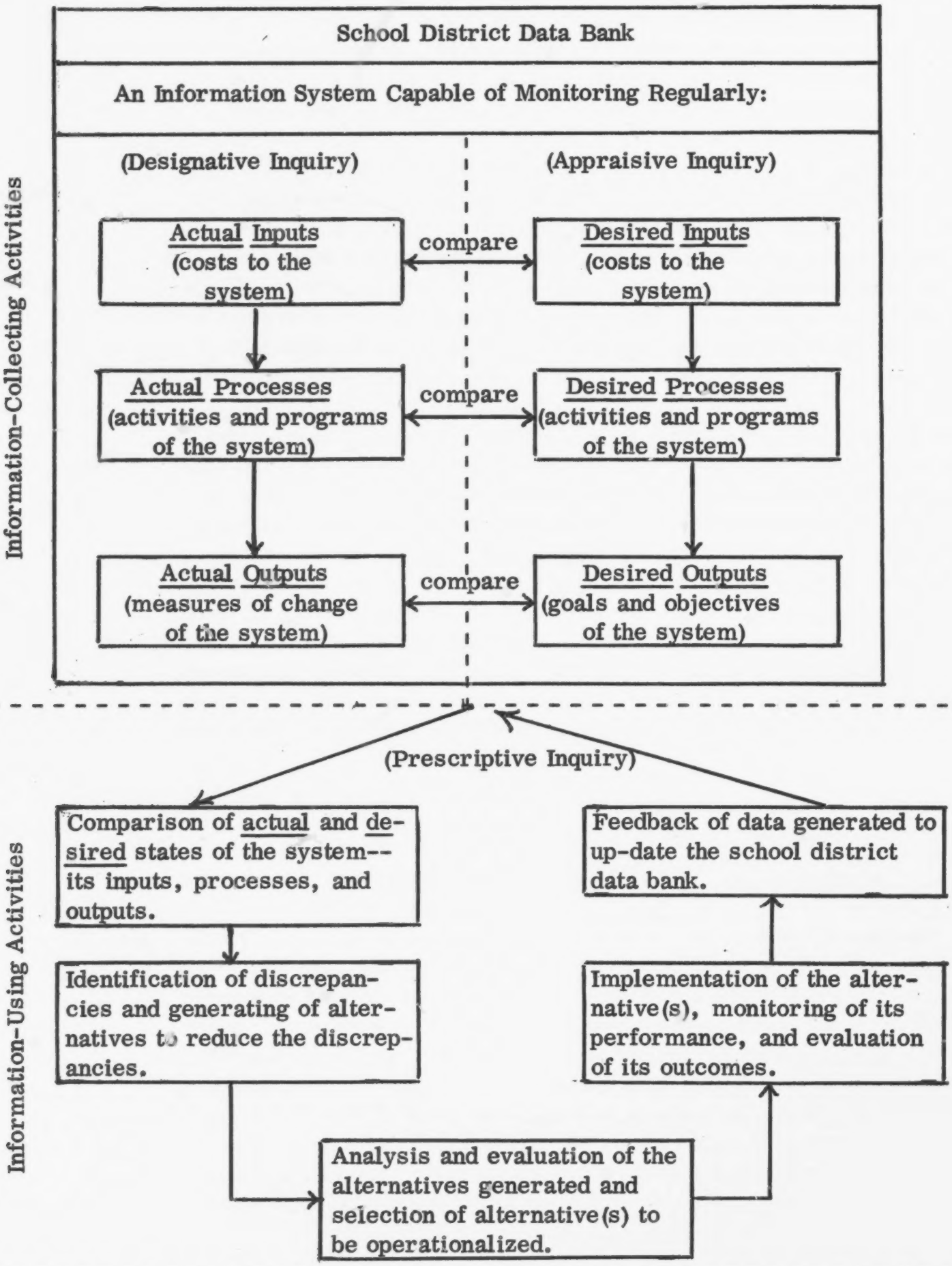
3. District personnel identify the actual outputs which are associated with each of the actual processes identified in the district--that is, the outcomes or products of the district's on-going activities and/or programs.

B. District personnel engage in appraisive inquiry and develop a data bank of information related to the desired states of the system--its inputs, its processes, and its outputs.

1. District personnel identify and refine the complete set of educational philosophies, goals, and objectives which either do now or should in the future guide all activities and/or programs in the district. This set is, of course, expected to be educationally sound, relevant to the needs of students, and supported by both citizens in the community and professional personnel in the schools. Moreover, this set is expected to be disaggregated to the level of objectives which are capable of measurement and stated behaviorally and which, therefore, indicate explicitly the desired outputs of the school district.

Figure 9

A Refined Conceptualization of PPBS


School District Data Bank
An Information System Capable of Monitoring Regularly:
(Designative Inquiry)
(Appraisive Inquiry)
Actual Inputs (costs to the system)
compare
Desired Inputs (costs to the system)
Actual Processes (activities and programs of the system)
compare
Desired Processes (activities and programs of the system)
Actual Outputs (measures of change of the system)
compare
Desired Outputs (goals and objectives of the system)
Information-Collecting Activities
(Prescriptive Inquiry)
Comparison of actual and desired states of the system--its inputs, processes, and outputs.
Identification of discrepancies and generating of alternatives to reduce the discrepancies.
Analysis and evaluation of the alternatives generated and selection of alternative(s) to be operationalized.
Implementation of the alternative(s), monitoring of its performance, and evaluation of its outcomes.
Feedback of data generated to up-date the school district data bank.
Information-Using Activities

2. District personnel deduce from the defined set of philosophies, goals, and objectives the set of desired processes which are considered necessary to the achievement of each of the district's desired outputs. These desired processes consist of potential school district activities organized into programs to achieve the particular desired outcomes.

3. District personnel identify the expected or desired inputs which can be associated with each of the desited processes identified--that is, they identify the inputs associated with each of the activities and programs considered necessary to achievement of the district's desired outputs. Identification of these desired inputs is not unlike preparation of the traditional budget document --though the focus here is upon desired rather than actual processes.

C. Closely related to these first two major operations--designative and appraisive inquiry regarding inputs, processes, and outputs--district personnel also develop an information processing system that is capable of monitoring regularly any future information which is relevant to the district's data bank, information which reflects actual and desired states of the system, inputs to it, processes of it, and outputs from it. Included here, of course, are the needs for an organizational structure of the district's activities and/or programs, a cost-accounting system for monitoring inputs to these activities and/or programs, and a testing or evaluation system for monitoring outputs from those activities and/or programs.

II. Use of Available Information to Plan for the Future

A. District personnel compare the actual and desired states of the system in terms of its inputs, its processes, and its outputs.

B. Where it is possible to identify significant discrepancies between the actual and desired states of the system in terms of its inputs, processes, and/or outputs, district personnel generate alternatives which, if implemented, might reduce those discrepancies. Both discrepancies discovered and the alternatives generated may deal with inputs, processes, and outputs either separately or in combination. Generally though, as suggested earlier, given the fundamental purpose of an educational organization, the discrepancies considered significant will most often be discrepancies in actual and desired outputs and the alternatives generated will most often deal with

potential changes in the district's inputs (allocation of resources) or processes (activities and programs) or some combination of the two.

C. Employing techniques associated with benefit-cost analysis and cost-effectiveness analysis, district personnel analyze and evaluate each of the generated alternatives in terms of their anticipated effects upon the discrepancy between actual and desired states of the system. To the extent possible, analyses are expected to be quantitative and comparably based, for, ultimately, district personnel must select from those generated the alternative(s) which can be implemented with the greatest probability of reducing the identified discrepancy.

D. District personnel operationalize the alternative(s) selected, monitor its performance (its inputs, processes, and outputs), and periodically evaluate the outcome in terms of the desired and actual states of the system. This monitoring process is essentially another kind of designative inquiry.

E. Finally, through carefully structured cybernetic channels, district personnel analyze carefully the evaluative data generated, up-date the district's data bank with regard to actual inputs, their processes, and outputs, and then recycle the entire planning sequence, starting with the identification of new significant discrepancies and proceeding through all steps outlined to the final evaluation of operationalized alternatives and feedback of that data to the data bank.

Part Four: Strategies for Implementing PPBS as an Innovation

The Necessary Components in a Data-Based Planning System

Given the refined conceptualization of PPBS presented in Part Three, we c can now see that to operationalize a data-based planning system, a school district must gradually develop an extensive management information system which can provide decision-makers regularly with the kinds of data needed for output-oriented planning. As Figure 9 indicates, the district's data bank ought to include six general data files as well as systematic processes for regularly up-dating those files. The six files ought to contain information about both actual and desired states of the system, its inputs, processes, and outputs; and the processes for regularly up-dating the data files ought to include a cost-accounting system for monitoring actual inputs, a testing or evaluation system for monitoring actual outputs, a recording system for monitoring actual processes, and an interrelated set of procedures for generating desired outputs, processes, and inputs for the school district.

These required components of the district's data bank seem to hold regardless of whether the scope of planning is to be an entire school district or just a part of it. That is, if we accept two propositions espoused throughout this discussion--first, that output-oriented planning in an educational organization deals with organizational inputs, processes, and outputs, and, second, that it involves a decision-maker in designative, appraisive, and prescriptive inquiry --then it matters not whether that being planned is the instructional program for

the entire district or just one of the many courses in the curriculum, whether it is the pupil transportation program or the maintenance and operations program, whether it is the teacher recruitment program or the dropout program. To plan any of these, the decision-maker needs to know their desired and actual states in terms of inputs, processes, and outputs.

As indicated very early in the introduction, this is not to say that one cannot possibly plan until he has obtained all the information for all six data files. Such a statement would indeed be ridiculous, for educational organizations have always engaged in a kind of planning--budgets have been prepared, curricular guides written, and lesson plans drawn up. It is to say, however, that traditional planning has tended to consider only future processes and the inputs to them, whereas the kind of data-based planning espoused throughout this discussion is clearly output-oriented. It takes its cues from information about actual outputs and seeks to manipulate inputs and processes so as to better achieve desired outputs. To the extent, therefore, that planning is output-oriented, the six data files must be filled. And it is precisely this possibility that makes PPBS a valuable technology for public education.

Two Major Concerns Related to Implementation

For any school district interested in implementing PPBS, there are two major concerns which are likely to arise. One of these concerns turns on the question of how extensively the data bank must be developed before planning can

take place. The other concern turns on the question of where to begin the process of developing data files. We shall look briefly at each of these concerns.

School districts now involves in aspects of PPBS vary in the degree to which they intend to develop a school district data bank--that is, the degree to which they intend to gather the six kinds of data about their districts. Some districts are content to collect information only about actual processes and actual inputs before they launch into planning. Planning for them consists, therefore, of the kind of input-oriented planning alluded to earlier-- projections of desired inputs and processes in terms of current inputs and processes. For many, this is essentially what program budgeting amounts to.

Other districts want to develop a data bank which contains information about <u>all</u> aspects of the system--<u>all</u> activities and programs, <u>all</u> inputs to them, and <u>all</u> outputs from them--before they engage in any planning whatsoever. And still other districts have decided that, rather than dealing with the entire district, they will focus on one narrow and limited set of activities for their first planning effort. That is, they have identified one particular program as a planning unit and are now attempting to gather the six kinds of information about just that one particular program so that they can enter the planning cycle with all the data necessary for truly output-oriented planning.

The question of where to begin the process of data collection--which of the six files to develop first--is somewhat more complex than is the question of how broad the scope of the data file should be. The complexity is created by the

need to interrelate the six files. Two general approaches can be identified, one an "ideal deductive approach" and the other a more "empirical inductive approach." The first of these two approaches suggests that the first file to be developed is that which deals with desired outputs, and so a school district would initiate PPBS by attempting to define its goals and objectives. From these statements of desired outputs, the other five files can be deduced: programs of activities can be defined, inputs identified, alternatives generated, and so forth. Evidence to date suggests that the "ideal deductive approach"--the approach implicit in nearly every conceptual statement of PPBS, including the original conceptualization presented in Part One--may not be very useful, because it fails to take into consideration the existence of an already operating organization with a very real set of inputs, processes, and outputs. Making the crossover deductively from the ideal world to the real world--from grand statements of goals to actual operating organizational units--seems at this point to be impossible.

The second general approach, characterized as the "empirical inductive approach," suggests that the first files to be developed are those which deal with the actual processes of the school district, the inputs to those processes, and the outputs from them. Only then, it is argued, can the district move legitimately to engaging in appraisive inquiry and developing files which reflect desired states of the system. Here too, though, the crossover from the real world to the ideal world is difficult, and to date, no school district in the country has fully solved the problems which arise. Though a school district which follows

the "empirical inductive approach" may well be able to develop all six files of data relevant to one particular program or set of activities, it is likely to discover that its statements of desired outputs for that particular program are only peripherally related to the district's broad educational goals and objectives. In other words, it is no easier, if indeed it is even possible, to move inductively from actual on-going activities to broad goals and objectives than it is to move deductively from the broad goals and objectives to the actual on-going activities.

All of which has led those of us at CASEA to believe that any strategy for implementing PPBS must include some balanced mix of both the "ideal deductive approach" and the "empirical inductive approach." Consequently, the strategy for implementing PPBS--or, more broadly speaking, for implementing an output-oriented educational planning system--which will be espoused in the CASEA package of instructional materials will attempt to incorporate elements of both these general approaches. A brief outline of the CASEA Approach follows.

The CASEA Approach to Implementing PPBS

As already indicated, those of us at CASEA have been working to develop an approach to implementing PPBS that can serve as the basis of a package of instructional materials for school administrators who wish to learn how to design, adopt, and operate a data-based planning system in their schools or school districts.

The CASEA Approach to Implementing PPBS has several general

characteristics. First, as indicated above, it attempts to incorporate elements of both the "ideal deductive approach" and the "empirical inductive approach." For instance, it builds upon the present and moves incrementally to some future ideal state. It suggests that school personnel interested in PPBS can work initially within the framework of the district's current organizational structure and that over time they can gradually move planning from a focus upon organizational units to a focus upon desired outcomes. Similarly, the CASEA Approach suggests that district personnel can initially employ whatever input, process, and output data is already available to them and that over time they can gradually augment the quantity and quality of those data.

Second, the CASEA Approach enables district personnel to engage in both kinds of planning discussed earlier--both input-oriented planning which considers only inputs and processes as well as output-oriented planning which focuses upon outputs and considers inputs and processes as means to increasing those outputs. That is, the CASEA Approach allows district personnel to engage simultaneously in two kinds of planning: (1) comprehensive financial planning of all identifiable school district processes and (2) detailed, systematic output-oriented planning of those activities and programs for which specific inputs, processes, and outputs can be identified.

And third, the CASEA Approach allows district personnel to move incrementally over a five to ten year span from a planning system which is oriented to the specific objectives of existing activities and/or programs to one which is

oriented not only to those specific objectives but also to the relationship between those specific activity and/or program objectives and the broad aims and goals of the school district. Gradually, by working both inductively and deductively, the district establishes a crosswalk between its ideal and real or desired and actual states.

There are six major phases of activities through which district personnel progress as they employ the CASEA Approach to move their district from where it now is in its planning operations to where it might be in a data-based planning system. Very briefly, these six phases can be described as follows:

The CASEA Approach to Implementing PPBS

PHASE ONE: Preparation for a specified period of time of a Total Direct Cost Activity Matrix (TDCAM) for the entire school district and of individualized cost/activity matrices for the district's primary decision-makers.

The principal objective of Phase One is that district personnel collect designative data regarding the district's on-going processes and the actual inputs to those processes. Consequently, this initial phase requires that district personnel do the following:

1. Identify and categorize all major instructional and instructional-support activities in the district;

2. Identify and categorize all major costs which can be associated with those identified activities;

3. Disaggregate both the major activity categories and the major cost categories to levels of specificity which will be most useful to district personnel in their efforts to analyze and plan the district's future activities;

4. Prepare a two-dimensional matrix of these activity and cost categories for the total district (the district's TDCAM), and then derive from that total matrix a series of individualized cost/activity matrices for the district's primary decision-makers;

5. Develop both a coding system and a functional accounting system which can monitor and report both (a) cost data in terms of the identified activities at the particular levels of specificity selected and (b) allocative data for purposes of accurately allocating particular costs between and among particular activities;

6. Operate the accounting system for a selected period of time, such as three months or six months or one year; and

7. Then, using the cost and allocative data generated during that selected period of time, prepare (a) a TDCAM document which presents for the selected period of time the total costs of all school district activities at the lowest level of specificity in the TDCAM structure and (b) the series of individualized cost/activity matrices for the district's primary decision-makers.

PHASE TWO: Mathematical manipulation of the dollar cost data presented in the district's basic TDCAM document and in the individualized cost/activity matrices derived from the TDCAM.

The principal objectives of Phase Two are to familiarize district personnel with the matrix structures and to allow them to engage in input-oriented planning--that is, planning which moves from actual inputs and processes to desired inputs and processes without concern for either actual or desired outputs. In terms, therefore, of the six data files in the district's data bank, Phase Two is concerned only with the district's processes and inputs, their actual and desired states. The mathematical manipulations possible in Phase Two include the following:

1. Preparation of additional cost/activity matrices which can be derived from the district's basic TDCAM and which present aggregated cost and/or activity data;

2. Translation of dollar costs in any of the matrices prepared to coefficient or percentage costs;

3. Comparative analyses of particular matrices which indicate past and present costs of school district activities;

4. Preparation of matrices which present budgetary data--that is, predictions of expected dollar or coefficient costs over some future period of time;

5. Comparative analyses of particular matrices which indicate budgeted and actual costs of school district activities;

6. Preparation, translation and comparative analyses of specially-developed Allocated Cost Matrices in which one particular major activity and its sub-activities becomes the focal point of attention and the costs of all other district activities are allocated across that activity as indirect costs of its operation; and

7. If desired, translation of the dollar data in the district's basic TDCAM into a traditional line-item object category budget format.

PHASE THREE: Development of a wide range of mini-PPB systems for output-oriented planning, each of which is relatively limited in scope, consists of activities already defined in the district's basic TDCAM document, and involves district personnel in input-output analysis, planning, and evaluation.

The principal objective of Phase Three is to involve district personnel in output-oriented planning--planning which is based upon information about actual and desired states of not only inputs and processes, but of the outputs from those processes as well. Therefore, the intent of this third phase in the CASEA Approach is that district personnel begin on a limited scale the serious business of identifying output discrepancies and planning how to reduce those discrepancies. Working within the constraints of the district's basic TDCAM structure, district personnel begin by focusing upon a single set of activities which can be legitimately defined as a program. At this point, therefore, the term "program" takes on a particularlized definition, for it is now defined as "a set of activities which are organized to achieve a particular objective or set of objectives and for which there is specific data available regarding the inputs to and outputs from those activities." Having identified a particular program to be planned, district personnel follow this so-called pilot "operating program" through the processes of planning, implementation, and evaluation. And finally, having successfully planned and replanned the pilot "operating program," they replicate these same processes within the context of other sets of activities which can legitimately be defined as "operating programs."

Initially, the "operating programs" defined for these mini-PPB systems are likely to consist of activities arranged exactly as they are in the district's

basic TDCAM document. Eventually, however, the "operating programs" can be defined in such a way that they actually rearrange the activity categories presented in the basic TDCAM document. Over time, then, district personnel focus in depth on a variety of school district activities, and, as they do so, they gradually begin to develop the ability to define objectives, generate alternatives, make choices, evaluate outputs, and so forth--skills which are critical to developing a data-based educational planning system.

PHASE FOUR: Initiation, if not already begun, of a district-wide effort to define the major philosophies, goals, and objectives which either do or should guide the district's activities.

Though designated in the CASEA Approach as the fourth phase of activities in a school district's effort to implement PPBS, this district-wide effort to identify and define major educational philosophies, goals, and objectives need not actually be fourth in the sequence of activities engaged in by district personnel. For a variety of reasons, most of which were cited earlier, it probably should not be the initial activity for a district attempting to develop and implement a PPB system, but there is not reason why an attempt to identify goals and objectives cannot be initiated early in the process and then carried out simultaneously with other activities. For instance, at the same time some district personnel are preparing the district's basic TDCAM document, manipulating its data, and developing mini-PPB systems to plan particular sets of district activities, other district personnel might well be coordinating a district-wide effort to identify and refine the complete set of philosophical and operational aims and objectives that will guide the district's future.

The product of this effort in Phase Four is, of course, expected to be educationally sound, relevant to the needs of students, and supported in common by both citizens in the community and professional personnel in the schools, including teachers, administrators, parents, citizens, board members, and students. Though not necessarily critical to the success of the first three phases of the CASEA Approach, this effort to define the district's guiding philosophies is crucial to the success of the final two phases.

PHASE FIVE: Systematic development of a set of "intellectual programs" which will serve as a means for relating the school district's "operating programs" to its broad philosophies, goals, and objectives.

In Phases One and Two of the CASEA Approach, district personnel identified the costs of existing activities in the district, prepared a number of cost/activity documents, and manipulated the data in these documents; in Phase Three, district personnel identified sets of activities as programs and developed

a technique or set of procedures for planning the future of those activites which could legitimately be defined as the district's "operating programs"; and then in Phase Four, district personnel and others attempted to identify the complete set of educational philosophies, goals, and objectives which would guide the district's future operation. Now in Phase Five, these two endeavors--the empirical in Phases One through Three and the ideal in Phase Four--begin to come together, and, as a result, district personnel are increasingly able to plan future activities in terms of system-wide goals and objectives.

The key to this interrelation of the ideal and the empirical is the systematic development of a set of "intellectual programs" for the school district. Working deductively from the district's broad philosophies and goals defined in Phase Four and inductively from the district's "operating programs" defined in Phase Three, district personnel define a set of "intellectual programs" which can be directly related to both the broad district-wide goals and the specific objectives of the "operating programs." And as these "intellectual programs" are defined, they become for the district the focii of planning effort, for though these "intellectual programs" are never operationalized in the district, they are the critical yardsticks of success when evaluating the district's "operating programs" and related activities.

PHASE SIX: Development and refinement of an output-oriented and data-based planning system which attends to all "intellectual" and "operating" programs in the district and to the maximum number of alternatives both among programs and within programs.

This final phase in the CASEA Approach is, of course, many years away, if indeed it is ever possible of attainment. The intention, however, is clear: as district personnel develop an ability to define "intellectual programs," as they develop an ability to plan "operating programs" in which there is little or no discrepancy between actual and desired outputs, and as they develop an ability to generate, test, select, monitor and evaluate alternatives both within and among programs--then indeed PPBS and related systems planning technologies will have attained their full potential in an educational organization.

PPBS As A Highly Reactive Innovation

Finally, some attention should be given to the fact that PPBS is potentially a highly reactive innovation. Like any innovation, PPBS can vary considerably

in form and content as it is implemented in a school district, and so its effects upon the district's general operations can also vary considerably. On the one hand hand, for instance, if the implementation of PPBS in a school district results only in the use of a program budget format to report educational expenditures to a state department of education, then PPBS as an innovation will have only minimal effects upon the planning processes carried out in the district. On the other hand, if the implementation of PPBS includes the redefinition of goals and objectives throughout the district, the costing and evaluating of school district activities intended to achieve those objectives, the generation of new ways to achieve desired outcomes, and the allocation of district resources on the basis of input-output analysis, then, most assuredly, PPBS as an innovation has tremendous implications for an entire school district, for it will affect the daily behaviors of not only district financial personnel, but of teachers, administrators, students, and parents as well. In the first situation, PPBS can be thought of as a relatively <u>non-reactive</u> innovation in that it has little repercussion throughout the district; in the second situation, however, PPBS is an extremely <u>reactive</u> innovation, for it requires significant changes and adjustments in standard operating procedures at all levels of the school district's operation.

Since a fully operationalized PPB system does not yet exist in any school district in the country, the actual degrees of this reactivity have not yet been empirically established, but we can suggest some of the changes that will be required within a school district. For instance, a fully operationalized PPB

system will clearly require greater involvement of all school personnel in the district's total planning process. It will require decision-makers to identify school district programs and the activities which relate to those programs with much greater precision than they now do. It will require them to state more explicitly the measurable objectives of those programs and activities and to be more accountable for actual outcomes realized. It will require them to think in terms of multi-programs operating for multi-year periods of time. It will require them to identify both alternative strategies for achieving particular program objectives and alternative programs for achieving school district goals. It will require them to identify techniques for testing these alternatives either mathematically in simulations or experimentally over time. And it will require decision-makers to monitor, evaluate, and modify school district processes, inputs, and outputs on an as nearly continuous basis as possible.

In sum, then, a fully developed PPB system will create in a school district a need for new interdependencies and relationships between and among school personnel as well as a need for eventual reorganization of personnel assignments and tasks as on-going school district activities become more and more defined in terms of output-oriented programs and less and less defined in terms of traditional organizational structures. And as the payoff for these changes, PPBS will provide the means to achieving eventually a process of educational planning which is rational, systematic, output-oriented, and clearly data-based.

Part Five: A Bibliography of Selected Readings

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